

JOURNAL OF  
**Ultrastructure  
Research**

*Editor*  
FRITIOF S. SJÖSTRAND

*Editorial Board*

U. AEBI • B. AFZELIUS • J. ANDRÉ • B. BACCETTI • G. F. BAHR • A. BAIRATI • R. F. BAKER  
T. S. BAKER • L. BARAJAS  
R. J. BARRNETT • P. BAUDHUIN • S. R. BAWA • S. BULLIVANT  
D. CARLSTRÖM • P. CASSIER  
A. CLAUDE • A. I. COHEN • V. E. COSSLETT • W. TH. DAEMS • A. J. DALTON • M. DVOŘÁK  
R. M. EAKIN • F. A. EISERLING  
R. EKHOLM • K. ESAU • A. FREY-WYSSLING • L. L. HOEFERT • R. W. HORNE  
S. INOUÉ • E. KELLENBERGER • A. L. LEHNINGER • J. H. LUFT • A. G. MATOLTSY  
A. MAUNSBACH • R. K. MISHRA • L. PACKER • E. PAGE • S. L. PALAY • D. C. PEASE  
J. B. LE POOLE • E. PUVION • J. T. RANDALL • J. F. REGER • E. J. REITH • J. P. REVEL  
A. G. RHODIN • H. RIS • D. C. ROGERS • G. E. ROGERS • E. RUSKA • J. SCHRÉVEL • A. P. SOMLYO • W. STELI  
H. THEORELL • E. VIVIER • E. R. WEIBEL • R. S. WEINSTEIN • W. G. WHALEY • R. W. G. WYCKOFF

Volume 80  
1982



ACADEMIC PRESS, INC., PUBLISHERS, NEW YORK AND LONDON

A Subsidiary of Harcourt Brace Jovanovich, Publishers

Copyright © 1982 by Academic Press, Inc.

*All rights reserved*

No part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopy, recording, any information storage and retrieval system, without permission in writing from the copyright owner.

The appearance of the code at the bottom of the first page of an article in this journal indicates the copyright owner's consent that copies of the article may be made for personal or internal use, or for the personal or internal use of specific clients. This consent is given on the condition, however, that the copier pay the stated per copy fee through the Copyright Clearance Center, Inc. (21 Congress Street, Salem, Massachusetts 01970), for copying beyond that permitted by Sections 107 or 108 of the U.S. Copyright Law. This consent does not extend to other kinds of copying, such as copying for general distribution, for advertising or promotional purposes, for creating new collective works, or for resale. Copy fees for pre-1982 articles are the same as those shown for current articles.

MADE IN THE UNITED STATES OF AMERICA

## Contents of Volume 80

NUMBER 1, JULY 1982

M. CRÈVECOEUR, R. DELTOUR, AND R. BRONCHART. Quantitative Freeze-Fracture Study of Plasmalemma and Nuclear Envelope of <i>Zea mays</i> Root Cells during Early Germination .....	1
ANDREAS ENGEL, ROEL VAN DRIEL, AND RENÉ DRIEDONKS. A Proposed Structure of the Prolate Phage T4 Prehead Core .....	12
C.-H. BERTHOLD, O. CORNELIUSON, AND M. RYDMARK. Changes in Shape and Size of Cat Spinal Root Myelinated Nerve Fibers during Fixation and Vestopal-W Embedding for Electron Microscopy .....	23
C.-H. BERTHOLD, M. RYDMARK, AND O. CORNELIUSON. Estimation of Sectioning Compression and Thickness of Ultrathin Sections Through Vestopal-W-Embedded Cat Spinal Roots .....	42
HORACIO MERCHANT-LARIOS AND FLAVIO MENA. Evidence that Extracellular Glycoconjugates Interact with Prolactin Granules during Exocytosis in Lactating Rat Adenohypophyses .....	53
STELIOS PAPADOPOULOS AND P. R. SMITH. The Structure of the Tail of the Bacteriophage $\phi$ CbK .....	62
ROBERT OUTENREATH AND MARIANNE DAUWALDER. Ultrastructural and Radioautographic Studies of the Digestive Gland Cells of <i>Drosera capensis</i> . I. Development and Mucilage Secretion .....	71
S. GRUND, J. EICHBERG, AND F. ASMUSSEN. A Specific Embedding Resin (PVK) for Fine Cytological Investigations in the Photoemission Electron Microscope ..	89
JOACHIM R. SOMMER, PAUL C. DOLBER, AND I. TAYLOR. Filipin-Sterol Complexes in the Membranes of Cardiac Muscle .....	98
GARY R. POIRIER AND NANETTE NICHOLSON. Fine Structure of the Testicular Spermatozoa from the Channel Catfish, <i>Ictalurus punctatus</i> .....	104
M. YAMAGUCHI, R. M. ROBSON, AND M. H. STROMER. Smooth Muscle Tropomyosin Paracrystals .....	111

NUMBER 2, AUGUST 1982

G. BORGIA, J. CROWELL, M. COCCHIARO, N. ABRESCIA, A. LAMBIASE, G. D'ALFONSO, W. SCHREIL, AND M. PIAZZA. Ultrastructural Changes in Mouse Liver Cells: A Morphometric Study on the Influence of Morphine, Heroin, and Cardiostenol .....	123
MASSIMO DERENZINI, ANNIE VIRON, AND FRANCINE PUVION-DUTILLEUL. The Feulgen-Like Osmium-Ammine Reaction as a Tool to Investigate Chromatin Structure in Thin Sections .....	133
J. DAVID ROBERTSON, WERNER SCHREIL, AND MARY REEDY. <i>Halobacterium halobium</i> . I: A Thin-Sectioning Electron-Microscopic Study .....	148
SUSAN WALKER, C. Y. KAWANISHI, AND J. J. HAMM. Cellular Pathology of a Granulosis Virus Infection .....	163
MANFRED HÜNDGEN AND CLAUDIA BIELA. Fine Structure of Touch-Plates in the Scyphomedusan <i>Aurelia aurita</i> .....	178

ANDRÉ F. M. SCHOOTS, JOSÉ J. M. STIKKELBROECK, JOHAN F. BEKHUIS, AND J. MANUEL DENUCÉ. Hatching in Teleostean Fishes: Fine Structural Changes in the Egg Envelope during Enzymatic Breakdown <i>in Vivo</i> and <i>in Vitro</i> .....	185
ROMANO DALLAI AND BJÖRN A. AFZELIUS. On Zipper-Lines or Particle Arrays within the Plasma Membrane of Hemipteran Spermatozoa (Heteroptera, Insecta) .....	197
MANUELA MARTINS-GREEN AND ALAN M. ROTH. Tubular Aggregates in the Non-pigmented Epithelial Cells of the Ciliary Body of the Rhesus Monkey .....	206
RICHARD M. EAKIN AND JEAN L. BRANDENBURGER. Pinocytosis in Eyes of a Snail, <i>Helix aspersa</i> .....	214
J. L. WOODS AND D. F. G. ORWIN. The Cytology of Cuticle Scale Pattern Formation in the Wool Follicle .....	230
M. CARMO-FONSECA. Testosterone-Induced Changes in Nuclear Pore Complex Number of Prostatic Nuclei from Castrated Rats .....	243

NUMBER 3, SEPTEMBER 1982

EMILIA FRANCHI, MARINA CAMATINI, AND IVAN deCURTIS. Morphological Evidence of a Permeability Barrier in Urodele Testis .....	253
HANS GEORG FROMME, BRUNO VOSS, MARGARETE PFAUTSCH, MONIKA GROTE, KURT VON FIGURA, AND HANNELORE BEECK. Immunoelectron-Microscopic Study on the Location of Fibronectin in Human Fibroblast Cultures .....	264
F. P. REINHOLT, B. ENGFELDT, A. HJERPE, AND K. JANSSON. Stereological Studies on the Epiphyseal Growth Plate with Special Reference to the Distribution of Matrix Vesicles .....	270
DAVID L. RINGO, EDWARD F. BRENNAN, AND EUGENE H. COTA-ROBLES. Epoxy Resins Are Mutagenic: Implications for Electron Microscopists .....	280
NOBUTAKA HIROKAWA. The Intramembrane Structure of Tight Junctions: An Experimental Analysis of the Single-Fibril and Two-Fibril Models Using the Quick-Freeze Method .....	288
S. NAKAMURA AND H. MIKI-HIROSIGE. Coated Vesicles and Cell Plate Formation in the Microspore Mother Cell .....	302
DONALD F. G. ORWIN AND JOY L. WOODS. Number Changes and Development Potential of Wool Follicle Cells in the Early Stages of Fiber Differentiation ....	312
S. de PETRIS AND URSULA BAUMGARTNER. Spontaneous Segregation of Receptors for Peanut and <i>Helix pomatia</i> Agglutinins to the Uropod Region of Polarized Lymphocytes .....	323
E. CARLEMALM, J. D. ACETARIN, W. VILLIGER, CH. COLLIEX, AND E. KELLENBERGER. Heavy Metal-Containing Surroundings Provide Much More "Negative" Contrast by Z-Imaging in STEM than with Conventional Modes .....	339
R. M. GARAVITO, E. CARLEMALM, C. COLLIEX, AND W. VILLIGER. Septate Junction Ultrastructure as Visualized in Unstained and Stained Preparations ...	344
F. GONZÁLEZ-AGUILAR. Cell Volume Preservation and the Reflection Coefficient in Chemical Fixation .....	354

J. POLATNICK AND S. H. WOOL. A Novel Structure Seen When Foot-and-Mouth Disease Virus-Induced Poly (U) Polymerase Acts in a Cell-Free System .....	363
IVO WILDHABER, HEINZ GROSS, AND HANS MOOR. The Control of Freeze-Drying with Deuterium Oxide (D <sub>2</sub> O) .....	367
WILLIAM A. VOTER AND HAROLD P. ERICKSON. Electron Microscopy of MAP 2 (Microtubule-Associated Protein 2) .....	374
AUTHOR INDEX FOR VOLUME 80 .....	383

The Subject Index for Volume 80 will appear in the December 1982 issue as part of a cumulative index for the year 1982.

## INFORMATION FOR AUTHORS

*Journal of Ultrastructure Research* publishes papers dealing with the ultrastructural organization of biologic material as analyzed by means of electron microscopy, X ray diffraction techniques, X ray microscopy, and polarization optical analysis. Papers dealing with techniques and instruments that are of importance for the development of this field will also be accepted. The field covered by the journal extends from the structure of molecules that are of biologic interest to the level of cell and tissue organization at the limit of the range of light microscopy, with emphasis on high resolution papers dealing with electron microscopy. Preference will be given to experimental work, particularly those papers dealing with correlation of biochemical and structural properties. Purely descriptive contributions should deal with the discovery of new structural components.

*Submission of manuscripts.* Manuscripts may be submitted to Dr. F. S. Sjöstrand, Editor, Department of Biology, University of California, Los Angeles, California 90024.

Original papers only will be considered. Manuscripts are accepted for review with the understanding that the same work has not been and will not be published nor is presently submitted elsewhere, and that all persons listed as authors have given their approval for the submission of the paper; further, that any persons cited as a source of personal communications has approved such citation. Written authorization may be required at the Editor's discretion. Articles and any other material published in the *Journal of Ultrastructure Research* represent the opinions of the author(s) and should not be construed to reflect the opinions of the Editor(s) and the Publisher.

Authors submitting a manuscript do so on the understanding that if it is accepted for publication, copyright in the article, including the right to reproduce the article in all forms and media, shall be assigned exclusively to the Publisher. The Publisher will not refuse any reasonable request by the author for permission to reproduce any of his or her contributions to the journal.

*Form of manuscript.* Two copies of the manuscript should be submitted. Manuscripts in English, French, and German are accepted. They should be typed double-spaced on one side only of  $8\frac{1}{2} \times 11$  in. white bond paper with 1 in. margins on all sides. *Page 1* should contain the article title, author(s) name(s) and affiliation(s), a short running head (abbreviated form of title) not exceeding 40 characters including letters and spaces, and the name and complete mailing address of the person to whom correspondence should be sent. *Page 2* should contain a brief abstract (not exceeding 150 words).

*Manuscripts* should be submitted in complete and final form for publication. The policy of the Editor will be as prompt a publication as is possible; that is, from three to six months after the final date of receipt of the manuscript by the Editor.

*Figures.* Two sets of figures mounted on white illustration board, in camera-ready form must be submitted. Each figure must be labeled with press-on lettering either 4.7 or 3 mm in height and no larger than 7.8 mm in width. Do not label the figures with figure number. Indicate the number of the picture on the back of the illustration board or on the board adjacent to the picture. Applying the lettering to an overlay is not acceptable. As an alternative, each figure can be lettered directly with India ink outlined in white. It is important to remember that *all figures will be printed as received*.

The dimensions of the printed page,  $5\frac{1}{2} \times 8$  in., or  $140 \times 203$  mm, should be kept in mind when preparing the figures for publication. The width of the pictures on the mounted plates should either be 142 mm or 157 mm. In the case that the width is 142 mm, the height can be varied up to a maximum of 205 mm. Pictures that are 157 mm wide must be full page pictures, with a maximum height of 212 mm and a minimum height of 192 mm.

All figures, whether photographs or drawings, should be numbered consecutively, as Fig. 1, Fig. 2, etc. *Each individual figure must be numbered separately; do not use Fig. 1a, Fig. 1b, etc.* Other illustrations, such as diagrams, should be referred to as Chart 1, Chart 2, etc. Figure legends should be typed in sequence on a separate sheet.

Stereoscopic pairs should be submitted properly mounted with a stereobase of 65 mm, i.e., each half picture must be 65 mm wide and properly cropped for optimum stereo-viewing. The stereo-pairs should be mounted without space between them. They will be printed at the same magnification.

Graphs and diagrams should be carefully drawn in black India ink on white or blue-line coordinate paper. Lettering should be uniform and large enough to be legible after a reduction of 50–60%. Originals of drawings, graphs, and diagrams should be submitted.

A maximum of five pages of half-tone illustrations will be allowed per article; authors will be charged for excess half-tone illustrations. No color illustrations will be accepted unless the author is prepared to cover the cost of reproduction.

*Tables.* Tables should be typed double-spaced on a separate sheet and numbered with Roman numerals. Each table must have a short descriptive heading typed double-spaced over the table. Footnotes to tables should be identified by superscript lower case letters (*a, b, c*) and typed below the table. Tables should be planned to fit the proportions of the printed page.

*Footnotes* should be avoided, but if they must be used they should be numbered consecutively and placed (double-spaced) on a separate page at the end of the manuscript.

*References* should be arranged in alphabetical order according to the first author's surname and typed double-spaced on a separate page at the end of the manuscript. They should be referred to in text by the authors' surnames and the date of publication, e.g., Doe and Jones (1976), Jones *et al.* (1976), or (Doe, 1975; Jones, 1976). Abbreviations of journal titles should follow *Chemical Abstracts Service Source Index*, 1969. Note carefully the following styles for references.

WILLISON, J. H. M., AND DAVEY, M. R. (1976) *J. Ultrastruct. Res.* **55**, 303-312.

ROGER, G. E. (1964) in MONTAGNA, W., AND LOBITZ, W. C., JR. (Eds.), *The Epidermis*, pp. 178-180, Academic Press, New York.

SJÖSTRAND, F. S. (1967) *Electron Microscopy of Cells and Tissues*, Academic Press, New York.

*Proofs.* Galley proofs will be sent to the author, with a reprint order form. Authors will be charged for alterations in excess of 10% of the cost of composition.

*Reprints.* Authors will be furnished, free of charge, with 50 reprints without covers and may order additional quantities. Order forms are submitted with galley proofs. The order forms should be completed, indicating shipping and billing instructions, and returned with the proofs.

## Stereological Methods

**Volume 2: Theoretical Foundation**

**Ewald R. Weibel**

**1980, xvi + 340pp., £26.00 (UK only) / \$62.50, 0.12.742202.1**

This second volume deals with the theoretical foundations of stereological principles in greater detail than the first. The mathematical approach taken assumes different levels of sophistication, beginning with simple analytical reasoning, requiring no further knowledge than college level calculus, and proceeding to more advanced and more stringent derivations based on geometric probability theory and integral geometry. The aim of this volume is to provide the practising stereologist with a sound theoretical basis of stereological methods, enabling him to design his own analytical schemes.

## Functional Ultrastructure of the Kidney

**edited by Arvid B. Maunsbach, T. Steen Olsen and Erik Ibsen Christensen**  
**1980, xvi + 486pp., £40.00 (UK only) / \$96.00, 0.12.481250.3**

Our information on the ultrastructure, physiology and pathology of the kidney is considerable, yet one key area, that of the relationship between ultrastructure and function, remains comparatively little understood.

This book is based in part on the presentations made at a recent international symposium, Correlation of Renal Ultrastructure and Function, convened at Aarhus, Denmark, in recognition of the need to rectify this situation.

**Academic  
Press**



*A Subsidiary of Harcourt Brace Jovanovich, Publishers*  
**London New York Toronto Sydney San Francisco**  
24-28 Oval Road, London NW1 7DX, England  
111 Fifth Avenue, New York, NY 10003, USA

APL 1221